

Jason Held

Saber Astronautics



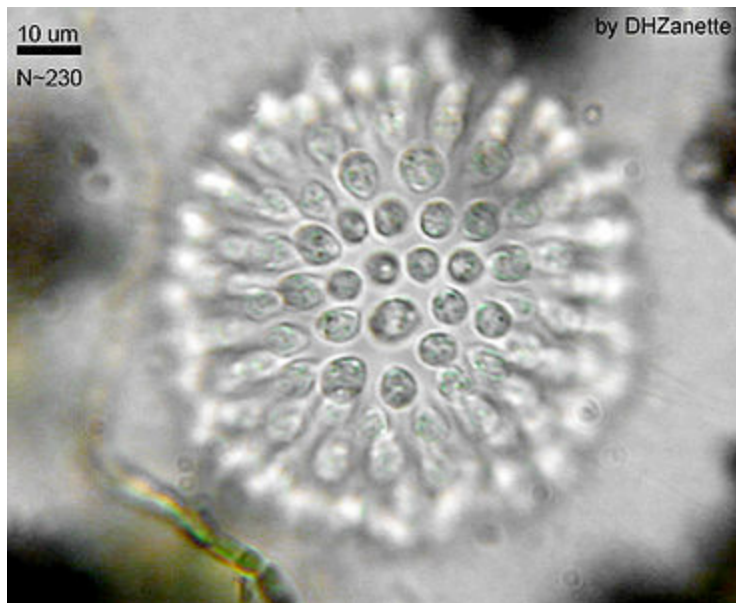
Modeling Systems of Systems

Performance of Synthetic Biology Systems

Dr. Jason Held

Why?

Biological Systems



Space Systems

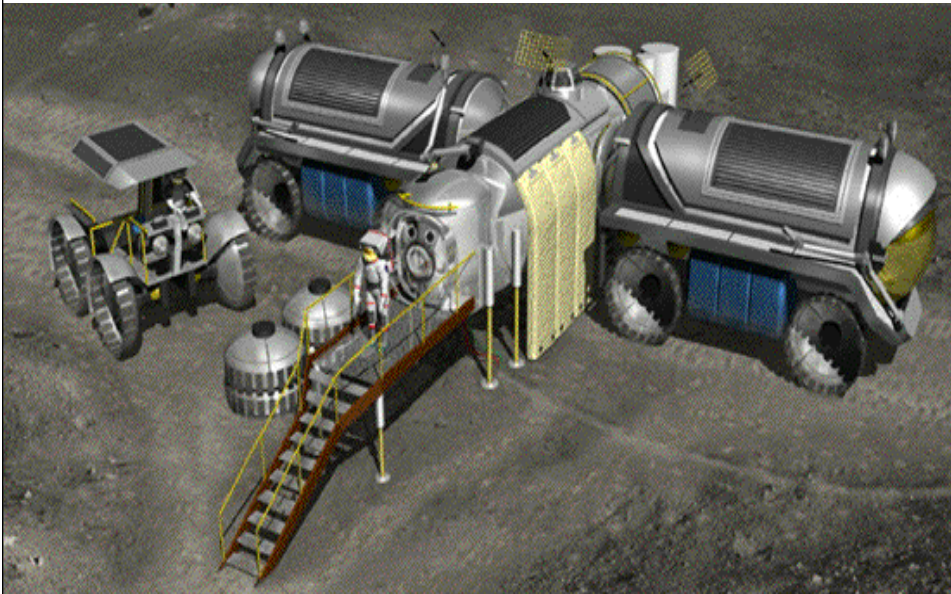


How do we know we've improved the systems as a whole?



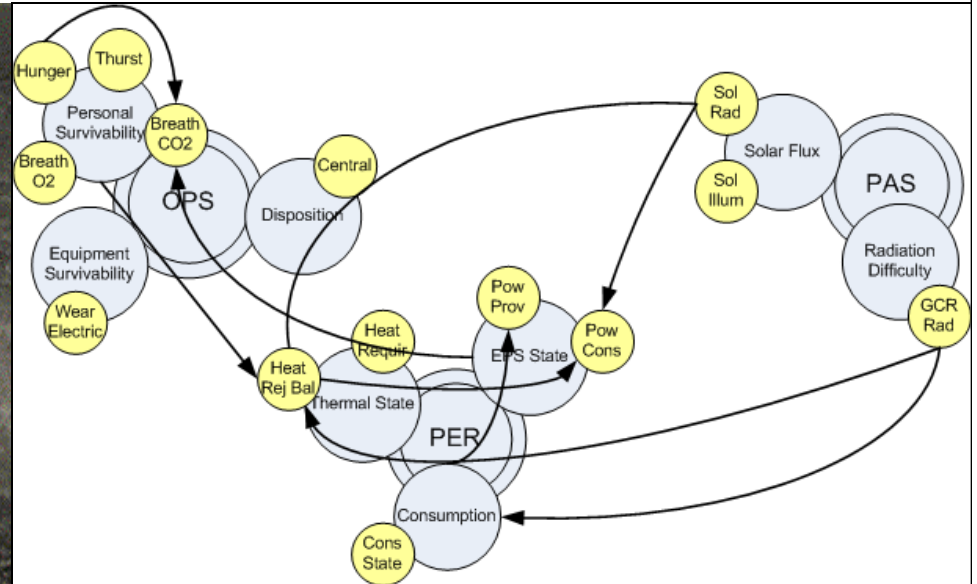
Performance Analysis

Platform-centric Designs



- Myopic
- Emergence
- Nonscalable

System Map

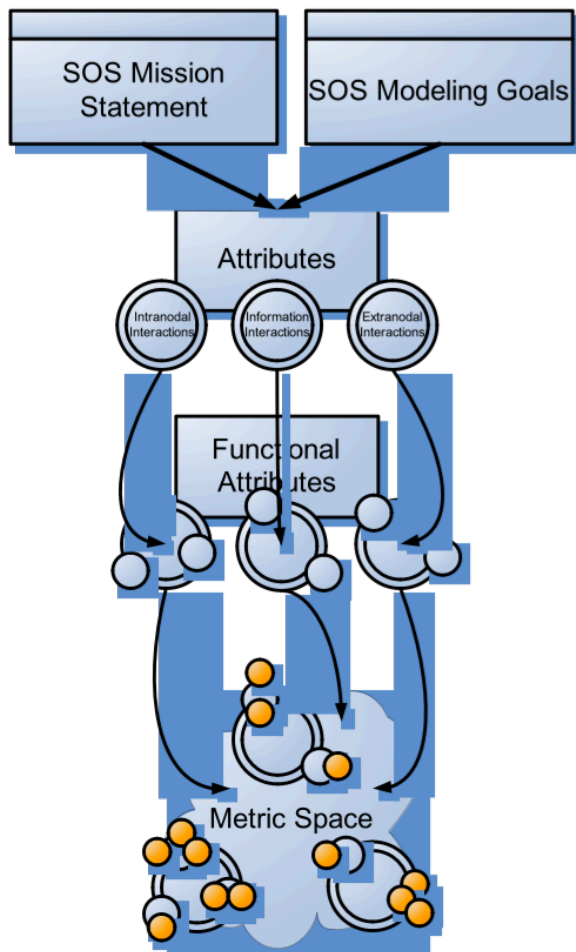


- Estimate cause and effect
- Design comparison between systems
- Online analysis from H/W telemetry

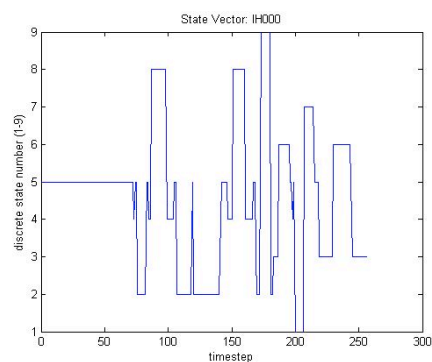
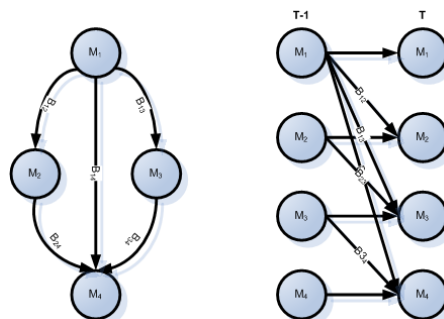


System Map Process

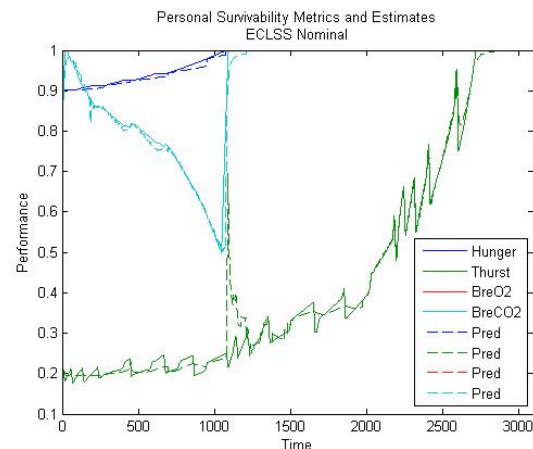
1. SoS Paradigm



2. Model



3. Estimation

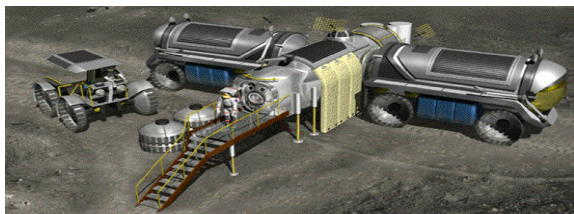


4. Analysis

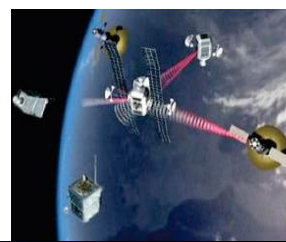
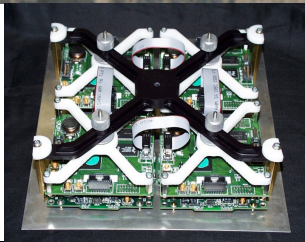
| FA Personal Survivability Performances | | |
|--|--------|----------|
| Test | Mean | Variance |
| Shackleton Base Nominal | 0.7222 | 0.0037 |
| Equatorial Nominal | 0.7930 | 0.0008 |
| Shackleton O_2 Generation Failure | 0.3923 | 0.0074 |
| Shackleton CO_2 Removal Failure | 0.4692 | 0.0053 |
| Shackleton Food/ H_2O Resupply Failure | 0.5310 | 0.0010 |

Where we're at

Systems Level



Component Level



Findings so far....

85-98% accuracy

What to measure is as important as **how**

Surprisingly general solutions

Future....

ORS Ground Station Project

